

DEVELOPMENT OF A TRAINING PROGRAM IN SANITATION
FOR FOOD SERVICE PERSONNEL

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TABLE OF CONTENTS

	Page
INTRODUCTION	1
REVIEW OF LITERATURE	2
Food Sanitation	3
Food Sanitation Agencies	6
Federal	6
State	6
Local	7
A Food Sanitation Program	7
Employee Training	10
Programmed Instruction	13
Activities of Programming	14
Application to Food Service Training	16
PROCEDURE	17
Development of the Program	17
Goals	18
Analysis of Subject Matter	18
Objectives	18
Criteria for Attainment of Objectives	19
Sequence	19
Presentation	20
Investigation	21
Selection of Subjects	21
Instruction	22
RESULTS AND DISCUSSION	24

	Page
Individual Achievement	24
Group Performance	28
Group Differences	30
Group Evaluation	32
Comparison	34
SUMMARY	35
CONCLUSIONS AND RECOMMENDATIONS	37
ACKNOWLEDGMENTS	39
REFERENCES	40
APPENDIX A	47
APPENDIX B	77
APPENDIX C	91
APPENDIX D	110

INTRODUCTION

Food sanitation may be defined as the preparation and service of safe, clean food. The goal of food sanitation is the prevention of foodborne illness. Sanitation is the responsibility of every food service operation and a part of each food service job. It includes the physical facilities of the food service and their maintenance; the philosophy, personal appearance, and habits of each employee; and the storage, preparation, and service of all foods. Effective sanitation requires constant effort and teamwork of all personnel in the organization. Management is responsible for the over-all sanitation policy and program; whereas the individual employee is responsible for sanitary operational procedures.

If a food service employee is to do his part in contributing to a safe, clean food service, the employee must be trained concerning sanitation duties and responsibilities. Sanitation training should include meaningful information about the purpose of food sanitation as well as basic operational rules and guidelines for attaining this purpose.

Employee training in a food service usually rests with supervisory personnel. These personnel have many other tasks and frequently do not have time or adequate materials to conduct an effective training program. It is exceptionally easy to overlook sanitation training because it often is assumed that an employee knows and understands why it is important to serve safe, clean food and how this should be done. Also, an

oral, lengthy elaboration concerning sanitation responsibilities and procedures of a specific food service job may be boring to both the employee and the supervisor.

There is a need for meaningful training materials that explain the purpose of food sanitation, the role of the employee in a sanitary food service, and simple, practical procedures of food preparation and service. This type of sanitation training can not attempt to answer all sanitation questions and policies but should stimulate employee interest and understanding and be a useful guideline for conducting thorough sanitation training in all types of food service operations.

The purpose of this study was to develop a basic training program in sanitation for non-professional food service personnel and to conduct an investigation to evaluate the effectiveness of the program.

REVIEW OF LITERATURE

Population growth, additional disposable income, and increased mobility are only a few factors that have contributed to the rapid growth and development of the food service industry. Meals are served in more than 367,000 food service operations, of which 93 per cent are public eating places. Foods served away from home have a retail value of \$28 billion a year (Mehren, 1968).

Food services employ approximately 4.5 per cent of the

American labor force. Maxcy (1968) pointed out that food and people compound the problem of sanitation and Foster (1968) stated the more a food is handled, the greater the opportunity for a problem of sanitation.

Regardless of when, where, or why an individual dines away from home, he assumes the food served is safe for his consumption. The challenge of preparing and serving safe, wholesome foods is the responsibility of all personnel in the food service industry (Vester, 1965).

Food Sanitation

Food service people must constantly observe a thorough food sanitation program because almost anything that infects man can be foodborne (White, 1966). Foodborne illness develops when foods, containing disease-producing agents in sufficient quantity, are consumed. The objective of the entire food processing system is to prepare and serve safe, wholesome food (Schweigert, 1968) but foodborne illness still occurs despite modern food processing plants and efficient kitchens (Woodburn, 1967).

Changes in the type and occurrence of foodborne illness may be traced through the development of food consumption practices. Abrahamson (1963) divided this development into three periods. The first period was the simplest, characterized by the individual family producing, processing, and consuming the food needed for its own use. This period was marked by

localized cases of botulism.

The family then began to produce cash crops; crops were sold in the market place and available for home and/or restaurant consumption. During this period, cases of foodborne illness remained localized and were attributed to poor food preparation and storage practices.

The third period of food consumption practices is hazardous. More foods are centrally processed, packaged, and distributed; less food is prepared in the home kitchen from basic ingredients; approximately one of every three meals is eaten away from home (Foster, 1968). Foodborne illness appears as an individual illness with no common location and frequently with no common food source.

Thousands of cases of foodborne illness are reported annually. The number of cases reported is believed to be less than one per cent of the total number of occurrences (Reed, 1966). In 1966 only 25 states reported outbreaks of foodborne illness, but in 1967 the number of reporting states increased to 37 (HEW, 1968a).

Ninety-five apparent foodborne outbreaks of unknown etiology were reported in 1961 (HEW, 1963). These outbreaks, resulting in hundreds of cases of foodborne illness, occurred in many types of food service operations including restaurants, hospitals, schools, and community kitchens. Statistics for places of acquisition of foodborne illness for 1967 showed 273 total outbreaks with 22,171 cases of illness (HEW, 1968a).

Salmonella was the major cause of foodborne illness and beef the most frequent vehicle.

Clostridium perfringens was indicated as the most frequent cause of foodborne illness during the first six months of 1968 (HEW, 1968b), with turkey, beef, and chicken the common vehicles. According to this report, 42 per cent of the foods were contaminated during preparation in a commercial establishment.

It is not possible to draw definite conclusions concerning outbreaks and cases of foodborne illness but there are definite trends. This type of illness is not limited to one specific type of food service operation, and the major cause of foodborne illness changes from one year to another. Although many outbreaks of foodborne illness are traced to the home, only a few people are involved. However, the number of outbreaks occurring in commercial establishments affects thousands of individuals.

Foodborne illness is not limited to severe headache, nausea, and diarrhea. Foods can serve as the link between virus diseases such as polio, hepatitis, and a variety of respiratory diseases. Communicable diseases of tuberculosis, undulant fever, scarlet fever, and diphtheria can be spread by contaminated foods (Longree, 1967). Gastroenteric illnesses are commonly traced to large numbers of bacteria in foods and are explosive in nature. Other types of foodborne illness are slower to develop and may be associated with a smaller

number of organisms in foods.

Food Sanitation Agencies

Federal, state, and local agencies combine efforts to help the food service industry achieve and maintain adequate sanitation. According to Ruppert (1966), the main purpose of all health agencies, regulatory or control, as related to food service, is the prevention of illness that may be caused or transmitted by food. Trade associations, private associations, and foundations also are involved in the sanitary aspects of food and cooperate with governmental agencies. Food processing companies, aware of the necessity to process foods in a sanitary manner, are beginning to use computer techniques to control and follow the entire food processing system from raw materials to the consumer (Schweigert, 1968).

Federal. Within the United States Department of Health, Education, and Welfare two divisions work for food protection; the Food and Drug Administration and the Public Health Service. Other governmental agencies involved in food sanitation include the Agricultural Marketing Service of the USDA and the Department of the Interior.

State. State health departments usually base sanitation laws and standards on federal recommendations. The state has more legal responsibility for public health and is often the enforcement agency for sanitation laws. Mehren (1968) suggested that by the year 2,000, all foods, regardless of origin, will be guaranteed for wholesomeness through

cooperative federal-state inspection programs.

Local. Requirements of local health departments are patterned after federal and state recommendations. These departments are in actual contact with food service operations and conduct inspection of establishments. On-the-spot enforcement of regulations is conducted at the local level.

A Food Sanitation Program

Although the primary aim of sanitation is the protection of the health of the consumer, it also is good business. The American public wants and demands clean, sanitary surroundings when eating away from home. The Gallup Symposium (1968) reviewed three surveys related to cleanliness in eating establishments. Cleanliness was found to be the second most important consideration when choosing a restaurant for dinner; lack of cleanliness was listed as the most annoying factor; and, assuming the food was good, cleanliness was named second as an item needing improvement.

Bacterial contamination of foods is a prime cause of foodborne illness (Dack, 1957); foodhandlers are a common source of contamination (Bergdon, 1969). The mouth, nose, and throat harbor many pathogens that can be transmitted to foods. According to White (1966), there is great danger in handborne contamination from one human being to another or from a human to foods. The food handler may be a carrier of disease, consequently transferring disease-producing organisms to food and

unsuspecting people. The Food Service Sanitation Manual (HEW, 1962) recommends that people affected with a communicable disease, boils, wounds, sores, or a respiratory infection should not work where there is a possibility that they may contaminate food or food contact surfaces.

Harmful bacteria grow rapidly at body temperature (98.6°F.) and, within a short period of time, produce a quantity of bacteria sufficient to cause serious illness. Foter (1963) noted that contaminated foods have generally been held at temperatures favorable to bacterial growth. Since time and temperature are key factors in food sanitation, each food service employee should know and understand the importance of time and temperature and should follow the trite rule of food storage, preparation, and service, "Keep hot foods hot, cold foods cold."

The Food Service Sanitation Manual (HEW, 1962) recommends that potentially hazardous foods be kept at 45°F. or less, or 140°F. or above. Although 45°F. is adequate for short storage, 40°F. will allow a margin of safety for unserved, cooked foods (Rappole, 1968). Foods placed in warming equipment should be heated to terminal temperatures considerably above 140°F. (Longree, 1967); and, to maintain foods at this temperature, a setting of 145°F. for holding equipment is helpful.

Management must go beyond sanitation recommendations and laws (Stokes, 1967). A fundamental point to emphasize is that the employee is responsible for the health of the patrons so

far as the food service is concerned. Rappole (1968) indicated that it is the responsibility of management to educate the employee in sanitary food handling procedures and that this training of personnel is the key to improving sanitation in the food service industry.

Food service has become highly specialized with each operation responsible for preparing and serving safe, wholesome food and each employee a specialist in his job. The conscientious food service employee becomes a specialist when he understands the need for and becomes aware of his role in providing a safe food service. If a dishwasher or other food service employee can be trained to think of himself as a specialist and a guardian of the health of customers and fellow employees, it gives him a feeling of importance. Once a sound sanitation program is established and employees understand its purpose and value, the result will be a smoother kitchen operation in all respects (Killorin, 1962).

Richardson (1965) suggested that food service employees should consider sanitation as a condition of being 100 per cent clean to the sight and touch and 100 per cent free of disease-producing bacteria. Pre-work training sessions should be conducted in personal hygiene, sanitation, and good house-keeping (Buchanan, 1967). There is an additional need to train an employee in appropriate sanitation when he is promoted, upgraded, or faced with changes in production methods.

Attitude and cooperation of personnel will lead to success

or failure of a food sanitation program. Maxcy (1968) suggested enlightened self-interest as one way to approach effective sanitation. Sanitation is personal interpretation, and judgments are made according to what a person thinks is right, based on past experience and training influence. Rappole (1968) explained that food service personnel may hamper the sanitation program through ignorance, cultural background, bad habits, and superstitions with regard to food. A few hours of training, at regular intervals, will help to overcome poor work and personal habits and will stimulate active employee interest in food sanitation (American Hospital Association, 1966).

Employee Training

Training has been defined by Warner (1963) as changed behavior; training taking place only when behavior has changed and the results measured. Dinkin (1963) pointed out that the aim of any training program is to increase the effectiveness of the organization by utilizing maximum productiveness of personnel. A training program also is the first step in integrating the purposes of the employee and the company (Tubbs, 1959). The goal of any training program, according to Madden (1964), is to teach people to respond in a certain way in a given situation or to perform job requirements at the time needed.

An immediate problem facing the food service industry was

cited by Conner (1967) as that of training staff workers. The typical food service employee is responsible for a wide variety of independent tasks, each involving a small amount of work time (Welch, 1966). This employee is not interested in the usual classroom instruction. He wants and needs training that has definite application and use (Lundberg and Armatas, 1964).

White (1968) believed that food services face many of the same training difficulties as a small company or factory. It is seldom economically feasible to conduct a full time program for personnel orientation and job instruction. Frequently, people responsible for training new employees are responsible for many other jobs. Training may not be uniform for each employee and the employee may have to wait until someone is available to give the instruction. Training personnel have repeated procedures so many times they become bored with them and when one teaches the same material time after time, there is a possibility of omitting important segments (Moore and Klachko, 1967).

Elliott (1967) claimed the most vital resource of the food service industry is the human being. This resource has not been tapped because of little or no training followed by inadequate and ineffective supervision. In a survey of Iowa restaurants, Bobeng and McKinley (1968) found that only 60 per cent of the managers provided employee training programs. Most of this training was conducted informally, on-the-job, in a

hit and miss fashion.

Training represents an investment of both time and money but Lundberg and Armatas (1964) stated it is more costly not to train. It has been estimated that a food service operator with eight employees may anticipate 150 per cent turnover (Employee Training Manual, 1969); the turnover costs for one food service employee may range from \$100 to \$2,000 depending on the skill of the employee (Elliott, 1967). Improved methods of food service training contribute to reducing employee turnover rates (Pleto and Sweatt, 1965; Baden, 1967).

The image of the organization and felt image of the employee prompt high turnover rates. If an employee does not respect his image and that of the company, White (1967) believed he will quit and seek more ego-satisfying employment. According to Buchanan (1967) the trained employee feels he is master of his job, has confidence in himself and his skills, and has pride and a feeling of security.

In addition to reducing employee turnover, training offers other significant advantages. Training of food service personnel is one of the most effective methods for increasing efficiency of a food service operation (Lukowski and Eshbach, 1963). Lower operating costs, less breakage and spoilage, less absenteeism, and fewer accidents have all been attributed to effective training. High standards of food production may be attained by training personnel in procedures involved in the preparation and service of food (West, et al., 1966).

Programmed Instruction

Lysaught (1961) believed industrial training would require new approaches and conditions. He suggested that programmed instruction may meet this challenge because there is individualized training as the need arises. Ofiesh (1965) noted that, although programmed instruction will not solve all training problems, it is more than a tool for the training director and should be considered a unique and systematic way of approaching many forms of training.

Programmed instruction has been applied in numerous situations. Industry, government, and municipal services believe this type of training to be useful and economical in a situation where only one or two new employees need instruction at a time (Downing, 1965). Niebler (1963) and Hershfield (1967) suggested that programmed training materials might replace a full time personnel training program. Programmed courses may be used to give basic instruction before the employee is scheduled on the job, as a supplement to on-the-job training, or as a review or an in-service training session. Carter, et al. (1964) found that experienced employees learned as much from a programmed course as inexperienced employees.

Programming has been defined by Lysaught and Williams (1963) as a process of arranging materials in a series of small steps intended to lead the student from what he knows to new knowledge and principles. The learning program is the completed route, ordered and ready for the student to follow.

When instruction is organized and presented in a programmed form, the information is standardized, not dependent on the knowledge, skill, or availability of an instructor or supervisor (Kaufman, 1965).

A number of educational principles form the basis of programmed instruction. Current learning theory suggests a shift of emphasis from the instructor to the student, stress on desired behavioral change, and flexibility for the student in terms of when, where, and how he approaches the learning task (Meirhenry, 1966). With programmed instruction, all instruction is goal oriented. Jacobs, et al. (1966) explained that the instruction is organized into an effective sequence; the student is actively involved in the learning process, proceeding at his own pace, and receiving immediate feedback or knowledge of results.

Teaching of theory and background are well suited to the techniques of programmed instruction (Wiley, 1966). Each employee requires some basic information and instruction before he is scheduled on the job. If this information is available in programmed form, it is possible for one person to simultaneously train a number of employees in different areas and a new employee may enter the training program at any time (Chidester, 1967).

Activities of Programming. Two activities involved in programmed instruction were identified by Brethower, et al. (1965) as analysis of subject matter and design of instructional

material. Preparation of a task analysis is the logical beginning when writing a training program (Latterner, 1964). Task analysis is a breakdown of the subject matter including who the person is, what the person does, how and why the person does the task, and the skills involved in the job.

The basic function of all food service operations was given by Welch (1966) as the preparation and service of food for human consumption. This function requires a series of operations, processes, tasks, and jobs which are intimately related. Following this premise, Welch adapted industrial task analysis to food service training. The analytical approach to food service training may be summarized as follows.

1. Establish a goal for the training program.
2. Develop a plan to cover all skills which will enable the worker to perform the tasks required in his job.
3. Construct a program consistent with the ability of the worker and indicating the best method to accomplish the task.
4. Present the subject matter in a form that the learner can understand and absorb the knowledge taught.
5. Test the learner for understanding and ability to apply the knowledge and skill.

After careful analysis of subject matter, it is necessary to design the instructional material to change some specific behavior. The statement of this design is the behavioral objective of the program (Brethower, et al., 1965). Hall and Paolucci (1962) defined a behavioral objective as a guide used to determine a course of action or the desired outcome of directed action. Objectives of a training program should show

measurable knowledge or skills that may be observed in the learner (Mager, 1961).

Statement of meaningful behavioral objectives enables the programmer to establish criteria for measuring attainment of the objective. A written test and a standard of job performance are useful in determining attainment of objectives (Latterner, 1964).

In summary, when developing a training program for food service personnel, it is necessary to specify goals, analyze the task, state meaningful behavioral objectives, present an orderly sequence of subject matter, and determine criteria for measuring attainment of objectives. This program should be self-paced and can be self-instructional although programs may generally be more effective when used by teachers (Jacobs, et al., 1966).

Application to Food Service Training. Application of programmed instruction to food service has been limited (Sumbingco, et al., 1969). Carter (1963) used a teaching machine to present a course in sanitation for food service personnel. Results of the study were favorable but more research was needed to determine if the employee would apply knowledge to on-the-job situations.

Other programmed courses for specific food service tasks have been developed, tested, and judged useful for training food service personnel. In general, these programs used visual and/or audio-visual media. Previous studies indicated that

visual training programs are liked and accepted by food service employees. A major advantage of visual training materials is that they tend to increase employee interest and efficiency without a large investment of managerial time.

More and more commercial and institutional food service operations are turning toward programmed pictures as a partial answer to training problems (Kayser, 1968). A well developed visual training program relieves both trainees and supervisors. Visual training programs can be taken to the unit and shown at that location. The employee learns in a more relaxed atmosphere and training is more uniform. The emphasis in these programs is usually on developing positive work attitudes rather than specific job skills (Hartman, 1968).

PROCEDURE

Development of the Program

A visual training program in sanitation for non-professional food service personnel was developed. The program was divided into six units:

- Unit 1. Why Food Sanitation
- Unit 2. Personal Hygiene and Grooming
- Unit 3. Housekeeping and Clean-Up
- Unit 4. Storage
- Unit 5. Preparation
- Unit 6. Service.

A step by step sequence of 35 mm color slides was used to present each unit.

Goals. As suggested in the Food Service Sanitation Manual (HEW, 1962), the goal of the entire training program was the protection of the health of the consumer and the employee. Additional goals of the program developer were to draw together sanitation principles applicable in any type of food service, to emphasize the role of the individual in each phase of sanitation, and to construct a meaningful training program for every food service employee regardless of previous education or experience.

Analysis of Subject Matter. Subject matter incorporated into units was based on sanitation literature, training books, and pamphlets. Analysis of subject matter was aided by the use of a six-column work chart. Principles, or rules of sanitation, were analyzed and categorized into one of the six areas of food sanitation.

Objectives. Behavioral objectives, pointing toward the over-all goals of the program were established. Unit objectives were:

- Unit 1. To understand the importance of food sanitation.
- Unit 2. To develop good habits of personal hygiene and grooming.
- Unit 3. To know and appreciate the responsibilities for and value of regular clean-up procedures.

- Unit 4. To realize and use appropriate storage of all foods.
- Unit 5. To know and apply sanitary food preparation techniques.
- Unit 6. To become aware of and practice proper serving techniques.

Criteria for Attainment of Objectives. A written test (Appendix A) for each unit, with the exception of Unit 2, was constructed. Because subject matter presented in Unit 2, Personal Hygiene and Grooming, was directly related to all units, questions over this unit were included in other examinations. Multiple choice questions were designed to determine achievement of the unit objective through understanding of facts and application of knowledge; true-false questions, to provide a quick review of subject matter.

The written test for Unit 1 was evaluated by graduate students enrolled in Food Service Administration, Department of Institutional Management, Kansas State University. The test also was administered to four full-time and three part-time food service workers employed at Lafene Student Health Center, Kansas State University. Questions were reviewed, and in some cases eliminated. The four remaining tests were evaluated for clarity and relevance by senior students enrolled in the Department of Institutional Management, Kansas State University. Students rated the questions good, fair, poor, or delete and suggested changes for improving test items.

Sequence. Detailed outlines of unit subject matter (Appendix B) were developed. The outlines were used to organize

information into a logical sequence and to serve as a basis for development of slides used in the visual presentation.

Using the written outline, sanitation facts and information were transferred to 5 x 8 inch cards. Simple cartoon-type drawings were used to illustrate the information since it was believed an employee would be more willing to accept and follow rules of sanitation if subject matter was presented in this manner. Script included with each picture was elementary and kept to a minimum. Since each unit was complete on a deck of small cards, it was possible to spread out the entire unit and make changes in pictures, script, and sequence. Duplication and/or restatement of key information was part of each unit and pertinent facts were reviewed as necessary in various units.

Presentation. Drawings and layouts were increased in size, with the use of an opaque projector, and transferred to 16 x 20 inch colored mat board. The mat boards were then photographed and pictures made into 35 mm color slides (Appendix C).

Slides were selected for the visual media because of adaptability and versatility. Advantages of slide training programs as cited by Wiley (1966) are summarized below.

1. Slides and slide projector are easy to store, move, and use.
2. Cost of a slide projector and slide programs is nominal and represents a relatively permanent method of training.

3. Material can be easily added to or deleted from a slide program.
4. A slide program is self-paced and may be used for individual or group instruction.

No audio was included in the training program so it could be adapted easily to group use, allowing the person in charge to answer questions and explain any part of the program at any time.

Investigation

An investigation was conducted to determine the effectiveness of the training program. Unit 1, Why Food Sanitation, was presented by two methods of instruction; individual slide study method and group lecture method.

Selection of Subjects. High school students were selected as test subjects because it was believed they would simulate untrained, non-professional food service personnel. Also, the students were readily available as individuals for the slide study presentation or as a group for the lecture presentation.

Test subjects were female students enrolled in Homemaking II classes at Clay Center Community High School, Clay Center, Kansas. The high school home economics instructor described Homemaking II students as a cross-section of girls with farm backgrounds from low-moderate to moderate income levels. The students had exhibited average academic achievement in home economics classes.

Each subject was asked to complete a brief background

questionnaire (Appendix D). Forty-seven students completed the questionnaire; 34 students completed the entire training program. Academic grade levels of subjects were 32 sophomores, eight juniors, and seven seniors. Tabulation of the questionnaire showed 20 students had some experience in preparing and serving food to the public through work in concession stands and other school oriented activities. No student indicated previous food service training.

Instruction. Subjects were divided into two groups according to the hour scheduled for Homemaking. Group 1, Hour 5, received instruction through individual slide study; Group 2, Hour 7, received instruction through group lecture. All instruction and testing were conducted during the regular Homemaking class period and proceeded according to the following schedule.

1. Pretest. A written examination (Appendix A) over subject matter presented in Unit 1 was administered two weeks prior to instruction.
2. Instruction. Instruction of Group 1 was given through individual viewing of the slide program, Unit 1, Why Food Sanitation (Appendix C). Before viewing the slides, each subject was given the following oral instruction.

"The slides you will see show basic information about the preparation and service of safe, clean food. Each person working in a food service should understand why it is important to prepare and serve safe, clean foods.

View all of the slides. View the slides again and think through answers to any questions. Be sure you understand all of the material on each slide. You may take as much time as you feel you need to learn the material. You may view the slides as many times as you like. Do not ask questions while looking at the slides.

You will be given a written test when you finish studying the slides. When you feel you know and understand the material on the slides, ask for the written test.

Please do not discuss the slides or the test with your classmates."

Each subject was then given oral instructions and a brief demonstration concerning the operation of the Kodak Carousel slide projector. Slides were advanced by each subject using a remote control attachment. Slides were projected on a white, 16 x 20 inch mat board and the subject was seated while viewing the material.

Lecture instruction, Group 2, was given to a group of 17 subjects. The lecture followed the unit outline (Appendix B) and was accompanied by selected mat board illustrations. Before beginning the lecture, subjects received the following oral instructions.

"The lecture you will hear includes basic information about the preparation and service of safe, clean food. Each person working in a food service should understand why it is important to prepare and serve safe, clean food.

You will be given a written test at the end of the lecture.

Please do not discuss the lecture or the test with your classmates."

3. Test. The written examination was administered when a subject in Group 1 indicated she had completed individual study of the slide program and to subjects in Group 2 immediately following the lecture.
4. Post test. Each subject was given the written examination, for the third time, three weeks after the instructional session. An oral, group evaluation of the training session was conducted at that time.

Identical test questions were used for each written examination, but the original examination was altered, after pretesting, for subsequent test sessions. The test was presented on colored paper, cover sheet changed, and order of pages rearranged.

RESULTS AND DISCUSSION

Effectiveness of the program was judged by group differences based on written examinations for immediate gain, retention, and over-all improvement. Group difference for immediate gain was instruction test less pretest score; for retention, instruction test less post test score; and, for over-all improvement, post test less pretest score. The pretest was administered two weeks prior to instruction; instruction test immediately following instruction; and post test three weeks after instruction.

Subjects were divided into two groups. Group 1 was instructed using Method I, Individual Slide Study, and will be referred to as Method I. Method II, Group Lecture, was used to instruct Group 2 and will be referred to as Method II. All results are based on 34 subjects who completed the entire training program.

Individual Achievement

Individual performance of subjects was not analyzed but will be noted. Raw scores of each subject, for both methods of instruction, fluctuated and followed no consistent pattern (Table 1).

For Method I, three subjects scored lower on the instruction test than pretest; the same subjects had lower post test scores than pretest scores. Scores of eight subjects followed a low-high-low pattern; whereas six subjects showed a

Table 1. Raw scores for individual achievement.

Method I				Method II			
Subject no.	Pre-test	Instruction test	Post test	Subject no.	Pre-test	Instruction test	Post test
120	34	35	34	219	33	36	35
108	33	31	29	215	31	35	33
112	31	33	34	218	31	34	32
107	30	32	31	212	30	34	33
110	30	33	32	220	30	33	35
121	30	33	34	207	29	34	33
122	30	33	31	210	29	32	32
123	29	30	29	203	28	34	33
206	29	27	25	223	28	34	26
111	28	34	35	201	27	34	31
117	28	24	23	202	27	32	31
224	26	34	34	214	27	31	34
106	25	26	27	222	27	34	34
109	24	28	30	204	26	30	30
103	23	26	27	209	25	30	31
104	22	32	27	211	25	31	29
101	21	29	24	221	25	33	30

low-high-high pattern and three subjects a high-low-low pattern.

All subjects in Method II scored higher on the instruction test than pretest and only one subject had a post test score lower than pretest score. Twelve subjects followed a low-high-low pattern; five subjects, a low-high-high pattern.

Scores for individual differences (Table 2) were based on raw scores and indicated the same trend as raw scores. Six subjects, Method I, and three subjects, Method II, showed negative retention scores. This difference was determined by comparing post test score and instruction test score; the subjects scored higher on the post test than instruction test. These negative differences may be attributed to practice on test questions, intermediate learning, and/or luck.

Over-all improvement was the difference between post test score and pretest score; immediate gain, the difference between instruction test and pretest score. Three subjects, Method I, showed negative over-all improvement; the same subjects had negative scores for immediate gain. For Method II, one subject showed negative over-all improvement but there were no negative scores for immediate gain. Positive increments, over-all improvement, were recorded for 12 subjects, Method I and 16 subjects, Method II. Two subjects, Method I, exhibited no over-all improvement.

Table 2. Differences for individual achievement.

Method I				Method II			
Subject no.	Immediate gain	Retention	Over-all improvement	Subject no.	Immediate gain	Retention	Over-all improvement
104	10	5	5	221	8	3	5
101	8	5	3	201	7	3	4
224	8	0	8	222	7	0	7
111	6	-1	7	203	6	1	5
109	4	-2	6	211	6	2	4
103	3	-1	4	223	6	8	-2
110	3	1	2	202	5	1	4
121	3	-1	4	207	5	1	4
122	3	2	1	209	5	-1	6
107	2	1	1	204	4	0	4
112	2	-1	3	212	4	1	3
106	1	-1	2	214	4	-3	7
120	1	1	0	215	4	2	2
123	1	1	0	210	3	0	3
206	-2	2	-4	218	3	2	1
108	-2	2	-4	219	3	1	2
117	-4	1	-5	220	3	-2	5

Group Performance

Group performance on three written examinations followed the same pattern throughout the testing program. Raw test scores were lower, range of scores was greater, and mean score less for Method I than Method II (Table 3).

Range of raw scores on the pretest, Method I, was 21 to 34 with a mean of 27.8; Method II, 25 to 33 with a mean of 28.1. The range of raw scores on the instruction test was 24 to 35 with a mean of 30.6 for Method I and 30 to 36 with a mean of 33.0 for Method II. In both methods, the range was less than pretest and the mean was greater than pretest.

Post test range, Method I, was 23 to 35 with a mean of 29.8; the range was less than pretest but greater than instruction test and the mean was greater than pretest but less than instruction test. The post test for Method II ranged from 26 to 35 with a mean of 31.9. This range was greater than both pretest and instruction test; whereas the mean was greater than pretest but less than instruction test.

Respective high scores on pretest, instruction test, and post test were 34, 35, 35 for Method I and 33, 36, 35 for Method II. Low scores for pretest, instruction test, and post test, in corresponding order were 21, 24, 23 for Method I and 25, 30, 26 for Method II.

Table 3. Group performance, range and mean, for Methods I and II.

Method I	Method II	Method I	Method II	Method I	Method II
Pretest		Instruction test		Post test	
34	33	35	36	35	35
33	31	34	35	34	35
31	31	34	34	34	34
30	30	33	34	34	34
30	30	33	34	34	33
30	29	33	34	32	33
30	29	33	34	31	33
29	28	32	34	31	33
29	28	32	34	30	32
28	27	31	33	29	32
28	27	30	33	29	31
26	27	29	32	27	31
25	27	28	32	27	31
24	26	27	31	27	30
23	25	26	31	25	30
22	25	26	30	24	29
21	25	24	30	23	26
Range 21-34	25-33	24-35	30-36	23-35	26-35
Mean 27.8	28.1	30.6	33.0	29.8	31.9

Group Differences

Group difference in Method I was compared with group difference in Method II using a Median Test (Fryer, 1966). The group instructed by Method I was at a lower achievement level throughout the testing program.

Group difference was highly significant ($p < .01$) for immediate gain (Table 4). There were no negative scores for the Method II group and differences ranged from eight to three. Method I group showed a difference range of 10 to minus four with three negative scores. Method I subjects indicated they had not carefully studied the slides while Method II subjects actively participated in the lecture.

The group difference for retention was not significant. Both methods of instruction appeared effective although Method II was at a slightly higher level. The range of differences, Method I, was not as great as the range for Method II. However, there were six negative retention scores using Method I compared to three negative retention scores, Method II.

Group difference for over-all improvement approached significance. Method II was more effective; the range of differences, seven to minus two with one negative score. Range of differences for Method I was wide; the highest over-all improvement score, eight and the lowest, minus five. Method I group contained three negative scores. Insignificant over-all improvement scores may be attributed, in part, to the written examination. Identical test questions were used throughout

Table 4. Group differences for Methods I and II.

Method I	Method II	Method I	Method II	Method I	Method II
Immediate gain		Retention		Over-all improvement	
10	8	5	8	8	7
8	7	5	3	7	7
8	7	2	3	6	6
6	6	2	2	5	5
4	6	2	2	4	5
3	6	1	2	4	5
3	5	1	1	3	4
3	5	1	1	3	4
3	5	1	1	2	4
2	4	1	1	2	4
2	4	0	1	1	4
1	4	-1	0	1	3
1	4	-1	0	0	3
1	3	-1	0	0	2
-2	3	-1	-1	-4	2
-2	3	-1	-2	-4	1
-4	3	-2	-3	-5	-2
Median test					
7.56**		0.12		2.94	
Wilcoxon-Mann-Whitney test					
-2.34*		-0.47		-1.60	

**Highly significant at the 1% level.

*Significant at the 5% level.

the testing program. Subjects stated they did not carefully read the post test and were bored with the same test questions.

Results of a Wilcoxon-Mann-Whitney Test (Fryer, 1966) were similar to the Median Test. Method II, group difference was significant ($p < .05$) for immediate gain, insignificant for retention, and approached significance for over-all improvement (Table 4).

Group Evaluation

Time was recorded for each subject, Method I (Table 5). Average time to complete individual study of slides was 11 minutes. In an oral evaluation, subjects agreed they had enjoyed viewing the slides and had found the material interesting. However, they did not feel a need or desire to learn the material, failed to see an application to their situation, and hurried to complete the study as quickly as possible. Subjects also reported they had been exposed to many sets of slides in academic classes.

All subjects indicated they had recently completed or were currently enrolled in a high school biology course. Much of the information in the training program was an elementary review of the biology course and subjects felt sufficiently prepared for test questions without accurately studying and understanding the slide program.

Group Lecture, Method II, required 35 minutes. Pertinent facts and information were stressed by the instructor and

Table 5. Time required for Method I.

Subject no.	No. of minutes
112	8
104	7
107	8
106	10
103	10
110	12
123	17
109	17
111	10
101	12
120	7
117	10
122	13
108	10
206	11
224	20
121	5
Average no. of minutes to complete slide program	11

related to subjects' situations. The lecture was accompanied by various mat board illustrations that helped to reenforce lecture material. Subjects were enthusiastic and reacted favorably to both the information and the instructor.

Comparison

An instructor was needed to present the 35 minute lecture, Method II; whereas Method I did not require an instructor. Depending on cost, availability of an instructor, as well as the number of trainees, it may be more economical to use Method I than Method II.

A valuable outcome of programming may not be so much the actual programs but the experience with the detailed methodology (Leuba, 1966). After developing the program, the programmer felt entirely at ease when presenting the group lecture and was able to discuss applications of subject matter in specific situations. A more realistic food service situation and more objective comparison of instructional methods would result if the lecture were presented by a person other than the program developer.

Unlike trainees in an actual food service operation, subjects in this study were similar in sex, age, and academic achievement. Homogeneous groups may have contributed to the relatively insignificant results of this limited investigation. Since each group did learn from the program, regardless of method of instruction, the program may be effective for

individual slide study or group lecture instruction.

Schramm (1964) pointed out that a problem exists when making a general comparison between visual training programs and the classroom situation. Characteristics of the training program can be described but it is more difficult to accurately explain the classroom lecture situation.

SUMMARY

Size and extent of the food service industry coupled with changes in food processing, distribution, and preparation have led to an increased awareness of the need for constant and thorough food sanitation procedures. Essential training in sanitation may not be conducted because of lack of time, training materials, and qualified instructors. Because sanitation is the responsibility of each food service operation and a part of every food service job, appropriate sanitation training of food service personnel cannot be overlooked.

The purpose of this study was to develop a basic sanitation training program for non-professional food service personnel and to evaluate the effectiveness of the program using two methods of instruction.

A six unit training program was developed. Five of the six units were accompanied by written examinations. Subject matter in each unit was illustrated with cartoon drawings and presented by 35 mm color slides.

A limited investigation was conducted to determine the

effectiveness of Unit 1. The program was presented by individual slide study, Method I, and group lecture, Method II.

Thirty-four students, enrolled in Homemaking II classes at Clay Center Community High School, were test subjects. Subjects were equally divided into two groups, according to the hour enrolled in Homemaking. Subjects in both groups completed a written examination at three intervals; two weeks prior to instruction, immediately following instruction, and three weeks after instruction. Criteria for determining effectiveness were group differences for immediate gain, retention, and over-all improvement.

Method II was significantly better for immediate gain and somewhat better for retention and over-all improvement. Instruction time for Method II was 35 minutes compared to an average of 11 minutes for Method I. Method I was self-paced and self-instructional although an instructor was required to give introductory remarks and an explanation of equipment.

The training program was effective when presented by either method of instruction. Although Method II was better in some ways, Method I offered the advantage of being self-instructional. A well structured training program may be used for training food service personnel when presented through individual slide study or group lecture.

CONCLUSIONS AND RECOMMENDATIONS

Results of this study and limited investigation indicate the following.

1. A sanitation training program can not attempt to answer all sanitation questions and policies but should be simple guidelines that stimulate employee interest and understanding.
2. A step by step procedure can be used to develop a basic training program in sanitation for food service personnel.
3. A well-structured sanitation program may be effective for individual study or group instruction and visual media are appropriate for either method.
4. A more objective evaluation of the program and methods of instruction could be achieved if the program developer was not responsible for presenting Method II and if the program was tested with actual food service employees.

Method I offers flexibility in training time and location, is appropriate for individual employee orientation and pre-work training, and may be used to stimulate employee interest and understanding. The program can be easily altered, by the addition or deletion of slides, to fit a specific food service operation. However, this method should not be used without follow-up and discussion by the supervisor.

Method II, with or without slides, may be used for group orientation, on-the-job training, and review sessions. A planned outline of subject matter offers a basis for an organized lecture-discussion and slides create employee interest and encourage questions.

Basic sanitation information, applicable to any food

service job, may be presented through a structured training program. Further study, using food service employees as test subjects, should be conducted to determine if the employees can and will apply sanitation knowledge and understanding to on-the-job situations.

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APPENDIX A

Name _____

SANITATION QUIZ

Multiple Choice

DIRECTIONS: Read each question. Choose the statement that best answers the question and place the letter of your choice in the blank at the left.

SANITATION QUIZ

True - False

DIRECTIONS: Read each statement. If the statement is true, place a (+) in the blank at the left; if the statement is false, place a (0) in the blank.

Multiple Choice

c If kitchen equipment is clean, which statement is most correct?

- a. Foodborne illness will occur.
- b. Equipment is never a source of bacteria.
- c. A careless employee may cause foodborne illness.
- d. There is no chance of foodborne illness.

b Foods that bacteria especially like are:

- a. dried beans and peas.
- b. meat and poultry.
- c. pickles and sauerkraut.
- d. apples and oranges.

a The food service employee:

- a. may carry harmful bacteria on his hands and face.
- b. carries bacteria but they are not dangerous.
- c. is not important in food sanitation.
- d. cannot prevent the spread of bacteria.

b A pan of cooked food, sitting on the counter:

- a. does not contain bacteria.
- b. is a good home for bacteria.
- c. will be a poor place for bacteria to grow.
- d. may contain bacteria but it will not matter.

b One cause of foodborne illness is:

- a. clean, neat employees.
- b. many harmful bacteria in foods.
- c. correct storage of foods.
- d. careful food preparation.

b One step to safe, clean food is:

- a. taste food before serving.
- b. good housekeeping and clean-up.
- c. smell food for off odors.
- d. season with salt and pepper.

c Most bacteria live best at:

- a. very cold temperatures.
- b. hot, dry temperatures.
- c. room temperature.
- d. moist, hot temperatures.

Multiple Choice

b Temperatures below 40°F:

- a. kill most bacteria.
- b. keep bacteria from growing.
- c. are good temperatures for bacteria.
- d. assure safe, clean foods.

c Which statement would you use to explain foodborne illness?

- a. Bacteria cause foods to spoil.
- b. Harmful bacteria cannot be carried by foods and food service employees.
- c. Harmful bacteria, carried by foods, cause sickness and disease.
- d. Foods cause sickness and disease because they do not taste good.

b Choose the best way to control foodborne illness.

- a. If there is some chance food is spoiled, throw it away.
- b. Work to prevent the spread and growth of harmful bacteria.
- c. Always taste foods before preparation and service.
- d. Control foodborne illness by seeing a doctor often.

c Keys to food sanitation:

- a. guarantee a clean food service and safe food.
- b. apply to your boss and supervisor.
- c. help prevent the spread and growth of bacteria.
- d. are not important to you as a food service employee.

a Which of the following best explains the connection between hands and food sanitation?

- a. Hands may move harmful bacteria from place to place and then to foods.
- b. Hands should not be used when preparing and serving foods.
- c. Hands are not important in food sanitation because they cannot be a source or cause of foodborne illness.
- d. Hands are used for many jobs and are often dirty.

Multiple Choice

d Bacteria like certain temperatures. What is the result of high temperatures on bacteria?

- a. Any cooked food will be clean and safe.
- b. Hot foods are never a source of harmful bacteria.
- c. High temperatures kill all harmful bacteria.
- d. High temperatures destroy most harmful bacteria.

b Which of the following will not help prevent the spread of bacteria?

- a. cover garbage and trash cans.
- b. use a counter cloth to dry dishes.
- c. clean the kitchen regularly.
- d. store foods quickly and correctly.

d A food service employee reported for work with a cold. The supervisor asked the employee to go home. Why?

- a. The supervisor knew the employee could not do a good job if he had a cold.
- b. Health of the food service employee was more important than the job.
- c. The supervisor did not want one employee to spread his cold to other employees.
- d. Employees, customers, and food might have been contaminated by the sick employee.

c You are working in a food service. You notice the ground beef to be used that day does not have a nice red color. What should you do?

- a. If the meat is not red, it should not be used. Throw it out.
- b. Appearance of raw meat is not important because cooking changes the appearance.
- c. There may be a good reason for the color of the meat. Ask the supervisor.
- d. The way meat looks does not mean bad meat. Smell it to make sure it is okay.

Multiple Choice

c The owner of a restaurant saw an employee sweeping the floor while customers were eating dinner. What do you think the owner should tell the employee?

- a. Never sweep the floor while customers are eating because it bothers them.
- b. Wait until most of the customers are gone and then sweep the floor.
- c. Do not sweep the floor while foods are being prepared or eaten. Dust and dirt may get into the foods.
- d. Sweep the floor whenever it needs it. A clean floor shows the entire restaurant is tidy.

d How would you answer the following question: "Can the idea of food sanitation be used only in a food service?"

- a. It is not necessary to practice food sanitation unless foods are being prepared in large quantities.
- b. There are more ways to use food sanitation in a food service and that is why it applies there.
- c. A food service is the best place to get foodborne illness so it is important to use food sanitation there.
- d. It makes no difference where or when foods are prepared and served. Use food sanitation.

c There are many results of foodborne illness. Foodborne illness commonly causes:

- a. coughing and sneezing.
- b. sore throat and a cold.
- c. diarrhea and vomiting.
- d. skin rash and irritation.

d A food service employee should understand foodborne illness because it:

- a. always occurs but has only minor results.
- b. is important only in food service work.
- c. is caused by preparing foods in large quantities.
- d. occurs because foods carry harmful bacteria.

Multiple Choice

- c Which of the following is not important in the prevention of foodborne illness?
- a. Serve hot foods piping hot.
 - b. Refrigerate cooked food immediately.
 - c. Increase cooking time of foods.
 - d. Keep bacteria out of foods.
- c In each food service, food sanitation is:
- a. not a responsibility of the food service employee.
 - b. important only to the person eating the food.
 - c. a responsibility of each food service employee.
 - d. the responsibility of the boss.
- b Which statement best describes dangerous bacteria? Dangerous bacteria:
- a. move quickly from place to place.
 - b. can be spread by a careless employee.
 - c. cannot be eliminated.
 - d. do not grow rapidly and are not a threat.
- c For growth, most bacteria need:
- a. food, high heat, dry climate.
 - b. high heat and lots of light.
 - c. moisture, food, room temperature.
 - d. air, food, cold temperature.
- c One way to explain food sanitation is:
- a. Sanitary foods look, smell, and taste good.
 - b. A sanitary kitchen assures sanitary foods.
 - c. Preparation and service of safe, clean food.
 - d. Dispose of all "left-over" food.
- a Bacteria that may cause foodborne illness are:
- a. Salmonella and Streptococcus.
 - b. Staphylococcus and Yeast.
 - c. Mucor and Caraway.
 - d. Comino and Marjorum.

True - False

- 0 All bacteria are harmful.
- + Serving foods correctly is a key to food sanitation.
- 0 You can always tell that food is safe to eat by tasting it.
- + Salmonellae and Staphylococcus are common causes of foodborne illness.
- 0 Bacteria are large and can be easily identified.
- 0 Bacteria do not grow rapidly.
- + Sanitation is a way of life. It should be practiced at home and on the job.
- + Foodborne illness may occur because an employee was careless when preparing a dish of food.
- 0 The more a food is handled, the less the chance that it may contain bacteria.
- + Personal cleanliness is an important key to food sanitation.

SANITATION QUIZ

Unit 3. Housekeeping and Clean-Up

Directions. Read each question. Choose the statement that best answers the question and place the letter of your choice in the blank at the left.

b After using a food chopper to chop vegetables:

- a. leave a note on the chopper so the next person will clean it.
- b. take apart and clean the chopper.
- c. wipe the outside of the chopper so it looks clean.
- d. wipe up around the chopper but it is not necessary to clean the chopper.

b In a safe, clean food service each employee:

- a. is responsible for keeping one certain area clean.
- b. cooperates to keep the entire food service clean.
- c. cleans only what he has to.
- d. tries to pass cleaning duties on to other workers.

d A cleaning schedule can be a help to the employee.
Check it for:

- a. the duties of other people so you know what to avoid.
- b. your duties so you can get someone else to take over.
- c. your duties so you won't make messes you have to clean up.
- d. the duties you are to do and when these should be done.

c An important part of good housekeeping and clean-up is:

- a. Do enough cleaning so the surface looks clean.
- b. Never clean-up something that is not assigned to you.
- c. For the best results, clean-up as you work.
- d. If you are in a hurry, leave the clean-up to someone else.

c For the best clean-up job, use:

- a. whatever tools and supplies are handy.
- b. lots of detergent.
- c. the right supplies and the right amount.
- d. plenty of hot water and elbow grease.

b Sanitizers are important in a clean food service. A sanitizer, when used correctly will:

- a. make equipment and dishes shine.
- b. kill or remove harmful bacteria.
- c. take the place of a detergent.
- d. guarantee the dishes are clean.

c A detergent is used to:

- a. remove and kill harmful bacteria.
- b. shine dishes and work surfaces.
- c. wash and clean equipment and dishes.
- d. remove all spots and stains on pots and pans.

d A sanitizer should be used:

- a. in the dish room.
- b. to wash equipment.
- c. in dish rinse water.
- d. on anything that can be washed and may touch food.

d If a chemical sanitizer is not available for dishes, which of the following could be used?

- a. Soak dishes in warm water.
- b. Wipe dishes with a clean cloth.
- c. Place dishes in clean rinse water.
- d. Use 170°F water for final dish rinse.

c Three main steps in any housekeeping or clean-up job are:

- a. wash, rinse, dry.
- b. soak, wash, rinse.
- c. wash, rinse, sanitize.
- d. rinse, sanitize, dry.

d Which of the following is not part of a good clean-up job?

- a. read instructions, follow directions.
- b. use correct supplies and tools.
- c. change rags and cloths often.
- d. clean only surfaces that look dirty.

b After using pots and pans for food preparation each employee should:

- a. carefully wash and dry pots and pans.
- b. if possible, rinse pans immediately.
- c. stack dirty pans out of the way.
- d. place pans back on the rack, ready for use.

 c When washing dishes by hand, 3 sinks are needed to:

- a. wash, rinse, stack.
- b. soak, wash, rinse.
- c. wash, rinse, sanitize.
- d. soak, wash, sanitize.

 b Select the statement that explains one way bacteria may be spread.

- a. Store pots and pans upside down.
- b. Dry dishes completely, using a clean cloth.
- c. Place glasses in racks, upside down.
- d. Drain dry all dishes and equipment.

 b Which of the following would be a good place for bacteria to grow?

- a. Sanitized pots and pans.
- b. Moist places behind equipment.
- c. Work surface, cleaned before and after use.
- d. A food chopper, cleaned after each use.

 d Good housekeeping and clean-up is important because:

- a. customers would rather eat in a place that looks clean.
- b. your boss likes to keep the entire food service clean.
- c. there is never a chance of foodborne illness when the food service is clean.
- d. a clean food service is more likely to serve safe, clean food.

 b When leaving soiled dishes in the dish room:

- a. stack the soiled dishes where you can find a spot.
- b. place soiled dishes away from clean dishes.
- c. pile the soiled dishes near the dishwasher.
- d. first move clean dishes out of the way.

b Pots and pans, used for food preparation:

- a. do not need to be sanitized.
- b. should be washed, rinsed, and sanitized.
- c. can be dried with a towel to save time.
- d. should be stored any place that is convenient.

b You are storing clean dishes. Which of the following would not be important?

- a. place glasses upside down in a basket or tray.
- b. put all tableware together in the same pan.
- c. store the same kind of dishes together.
- d. be sure tableware is stored with handles up.

c It is a good idea to immediately wipe up spills on the floor because:

- a. this will save a mop job later on.
- b. it is easier to wipe up a spill before it dries.
- c. you may prevent an accident.
- d. spilled food does not look good.

c An obvious fact in a safe, clean food service is:

- a. soil and dirt are allowed to build up.
- b. employees are not aware of cleaning duties.
- c. soil and dirt cannot be seen or felt.
- d. only the surfaces are kept clean.

c You are cleaning a large, standing mixer. Remember:

- a. the more detergent you use, the better job you can do.
- b. clean just the surfaces that show.
- c. do a thorough job under and behind the mixer.
- d. it is not necessary to use a sanitizer.

c Cloths, rags, and sponges used for cleaning should be:

- a. used until very dirty and then replaced.
- b. used one time and thrown away.
- c. washed, rinsed, and sanitized after use.
- d. rinsed with cold water and allowed to dry.

b Clean dishes and equipment should be moved from place to place:

- a. the easiest possible way.
- b. without touching eating surfaces.
- c. only on carts or in baskets.
- d. often so they won't get dirty again.

- b If dishes and tableware are washed and sanitized correctly:
- a. they will stay clean until they have been used.
 - b. a careless employee may ruin the dishwasher's job.
 - c. the employee may handle them any way that is convenient.
 - d. there is no chance they will get dirty before use.

Directions. Read each statement. If the statement is true, place a (+) in the blank at the left; if the statement is false, place a (0) in the blank.

- + Any surface that may come in contact with food should be cleaned and sanitized.
- 0 It is more important to do a good clean-up job in the dish room than anywhere else.
- 0 The more sanitizer used, the more sanitary the food service.
- 0 For best clean-up, use a large amount of detergent.
- + Save time and effort; clean-up as you work.
- 0 If the food service is kept clean there will be no chance of foodborne illness.
- 0 Since the cook does not work in the dish room, he has no clean-up duties.
- 0 The dishwasher is the most important person in a clean food service.
- + Clean dishes must be stored correctly.
- + If you clean equipment immediately after use, the job will be easier and take less time.

SANITATION QUIZ

Unit 4. Food Storage

Directions. Read each question. Choose the statement that best answers the question and place the letter of your choice in the blank at the left.

- d Select the incorrect statement. Food storage:
- a. preserves food quality.
 - b. is a key to food sanitation.
 - c. is a responsibility of the employee.
 - d. cannot be improved by the employee.
- a Perishable foods are foods such as:
- a. meat, eggs, dairy products, prepared foods.
 - b. pickles, catsup, mustard, olives.
 - c. dried beans, macaroni, spaghetti, noodles.
 - d. cereals, sugar, flour, meal, rice.
- c Dry storage protects food from excessive:
- a. light, heat, moisture.
 - b. dryness, light, moisture.
 - c. heat, cold, moisture.
 - d. moisture, cold, light.
- a All food storage areas should have:
- a. good circulation of air.
 - b. all food tightly covered.
 - c. adequate moisture.
 - d. warm, moist temperatures.
- c Select the best answer describing dry storage.
- a. Temperature of dry storage area is not important.
 - b. Dry stores should be tightly stacked.
 - c. Maintain a comfortable, even temperature in dry storage area.
 - d. Dry storage does not need regular cleaning.

c One important factor in correct food storage is:

- a. place old foods toward the back, out of the way.
- b. arrange foods so they can be easily seen.
- c. store oldest foods in front; use first.
- d. some foods may be stored longer than others.

c For best use of refrigerated storage:

- a. pack foods tightly.
- b. cover all foods tightly.
- c. allow air to circulate around foods.
- d. place foods in large, deep containers.

d Foods stored in a dry storage room:

- a. should not be covered.
- b. should be placed on the floor.
- c. will not spoil.
- d. should be stacked loosely.

c Refrigeration of foods will:

- a. kill all harmful bacteria.
- b. assure safe, clean foods.
- c. control food spoilage.
- d. improve flavor of foods.

b Food stored in the refrigerator:

- a. keeps indefinitely.
- b. should be kept in order.
- c. cannot be a source of bacteria.
- d. will not spoil.

a Unserved, cooked foods should be refrigerated immediately:

- a. to control growth of bacteria.
- b. for best flavor of food.
- c. so they will keep longer.
- d. to get them out of the way.

c To store prepared foods in the refrigerator:

- a. pack tightly to conserve space.
- b. pack in clean, large cans.
- c. store in shallow pans.
- d. place leftover items to the back.

b Perishable foods are stored:

- a. for a short time at 0°F. or below.
- b. immediately, in refrigerated storage.
- c. for a short time at room temperature.
- d. tightly wrapped in original wrapping.

 c Storage of cleaning supplies and poisons is best:

- a. handy, ready for immediate use.
- b. in marked containers with food items.
- c. away from food items in marked containers.
- d. any place that is out of the way.

 c Storage areas for food should not:

- a. maintain constant temperature.
- b. be cleaned regularly and thoroughly.
- c. be near pipes or heating units.
- d. have good ventilation.

 c Perishable foods, held in the danger zone:

- a. will not be a source of harmful bacteria.
- b. cannot cause foodborne illness.
- c. provide a good place for bacteria to grow.
- d. may lose flavor and appearance.

 c Joe is in charge of the storeroom. When new stock comes in he should:

- a. place it on the floor, out of the way.
- b. stack the new items in empty spaces at front of shelves.
- c. arrange new stock in back, old stock in front.
- d. put the stock where ever it will fit.

 c The supervisor has told you that you are responsible for checking the refrigerated storage each day. Which of the following items would not be included on your checklist?

- a. Thermometer reading of the refrigerator.
- b. Oldest food placed at front of shelves.
- c. Canned foods labeled accurately.
- d. No spills on shelves or floor.

b When storing unserved beef stew you should:

- a. place in a shallow pan, allow to cool to room temperature, refrigerate.
- b. place in shallow pan, cool quickly, refrigerate immediately.
- c. refrigerate immediately in large serving container.
- d. cool for several hours, cover, refrigerate.

c Correct food storage helps prevent foodborne illness because it:

- a. keeps food smelling and tasting good.
- b. improves the flavor by aging foods.
- c. protects food from harmful bacteria.
- d. keeps food out of the way until needed.

a The baker was looking for baking powder and picked up a can of poison instead. This mistake could have been prevented if:

- a. poisons were labeled and stored away from foods.
- b. all items in the store room were clearly marked.
- c. he had smelled the powder before selecting it.
- d. the can of poison had been a different shape.

d Frozen food, that has been thawed:

- a. must be used or discarded.
- b. should be refrozen immediately.
- c. should warm to room temperature before use.
- d. should be cooked immediately.

d Which of the following may cause the spread and growth of bacteria?

- a. Refrigerate cream pies until serving time.
- b. Thaw frozen foods in the refrigerator.
- c. Wipe up any spills in the refrigerator.
- d. Carefully mark any spoiled foods.

d Which statement is not true? Foods:

- a. are refrigerated to control food spoilage.
- b. placed in the refrigerator can be a source of harmful bacteria.
- c. cool more quickly in a shallow pan than a deep one.
- d. should be refrigerated to kill all harmful bacteria.

d Foods should be refrigerated because cold temperatures:

- a. improve food flavors.
- b. kill harmful bacteria.
- c. improve the quality of foods.
- d. control growth of bacteria.

 b You were told to take 25 pounds of frozen turkey from the freezer. The turkey:

- a. must be thawed quickly at high temperatures.
- b. should be thawed in the refrigerator.
- c. when thawed, must be served or thrown out.
- d. can be thawed at room temperature.

Directions. Read each statement. If the statement is true, place a (+) in the blank at the left; if the statement is false, place a (0) in the blank.

 + Store the same kind of food together.

 0 All foods can be kept the same amount of time.

 0 It is not necessary to check storage temperatures with a thermometer.

 0 Food stored at or below 0°F. can never be a cause of foodborne illness.

 + Foodborne illness may be caused because foods were stored improperly.

 + Correct food storage can prevent the spread and growth of harmful bacteria.

 + All storage areas should be clean, neat, and orderly.

 0 Unused frozen food should be refrozen immediately.

 0 It is not necessary to have clean hands when working with cold foods.

 + Refrigerate all dairy products and foods prepared with dairy products.

SANITATION QUIZ

Unit 5. Clean Food Preparation

Directions. Read each question. Choose the statement that best answers the question and place the letter of your choice in the blank at the left.

- c A pan of food has been held at 145° for one hour:
- Do not serve the food because it may be dangerous.
 - The food is stale and will not taste good.
 - Stir the food during the holding time to distribute heat.
 - Place the food in the oven to heat it thoroughly.

- b The baker prepared cream pies for lunch. The pies were allowed to cool for several hours and then refrigerated.
- Cream filling should be cooled completely before refrigeration.
 - Cooked foods should be cooled quickly and refrigerated promptly.
 - Cooked foods do not need special care after cooking because heat kills bacteria.
 - There is no danger in the cream pies because bacteria do not like this kind of food.

- a Clean food preparation is important because:
- Bacteria are everywhere and may be transferred to food during preparation.
 - The way food is prepared has an effect on how it tastes.
 - The employee is told to prepare foods in a certain way and should follow directions.
 - Clean food preparation will guarantee no chance of foodborne illness.

- c A cafeteria worker is putting salads out on the cafeteria line. She should:
- put all the salads out at once to save time.
 - serve only a few salads at a time because the counter will be less crowded.
 - for best quality and appearance, keep salads in refrigerator until needed.
 - fill salad counter full because salads will not deteriorate during holding.

b Beef stew is on the menu for lunch. The cook wants to sample the stew before serving. He:

- a. should stir the stew before tasting.
- b. needs to use a clean tasting spoon for the sampling.
- c. does not need to taste the food if he followed the recipe.
- d. probably should add more salt and pepper and forget the tasting.

 a Each food service employee is responsible for safe clean foods. Select the best reason.

- a. The more a food is handled, the more chance the food may pick up harmful bacteria.
- b. Each employee is only a small part of the food service.
- c. People in charge of the food service think it is best to prepare and serve safe clean food.
- d. Many people eat out and they like to be served safe clean foods.

 b After using her special knife, the salad girl should:

- a. rinse the knife quickly with cold water.
- b. wash the knife carefully and place it in the rack.
- c. wipe knife on counter cloth and place in rack.
- d. place knife in rack so no one will get cut.

 b Before beginning food preparation, always:

- a. wash hands and check ingredients.
- b. clean work surface and wash hands.
- c. set out equipment and read the recipe.
- d. read recipe and organize ingredients.

 a Frozen ground beef is needed for dinner the following night. An important point to remember is:

- a. The meat should be thawed in the refrigerator so that it will stay safe and clean.
- b. Foods may be thawed quickly by setting them in hot water.
- c. Frozen foods are considered safe foods so thawing method is unimportant.
- d. If foods are placed in front of a fan, they will thaw quickly.

 b Fresh fruits and vegetables:

- a. will not cause foodborne illness.
- b. should be washed and cleaned before use.
- c. are favorite foods of harmful bacteria.
- d. are safe foods and require little attention.

b Turkey was cooked until well-done. Not all of the turkey was served.

- a. Cool the turkey completely and refrigerate.
- b. Refrigerate the turkey as quickly as possible.
- c. Since the turkey was cooked until well-done, it does not need refrigeration.
- d. The remaining turkey should not be saved.

 a The danger zone of food preparation means:

- a. temperatures that are best for growth of bacteria.
- b. temperatures that will destroy the quality and appearance of food.
- c. room temperatures are dangerous to food and bacteria.
- d. dangerous temperatures for foods are very hot or very cold.

 a When preparing filling for meat salad sandwiches:

- a. cook the meat; chill before final preparation.
- b. mix all ingredients while warm; refrigerate immediately.
- c. prepare filling the day before it is needed.
- d. have all ingredients at room temperature.

 a Which of the following may cause foodborne illness?

- a. Frozen eggs are thawed quickly near the range.
- b. Gravy is stored immediately in a shallow pan.
- c. Potatoes are scrubbed, then baked at 350°F.
- d. Salad dressing is covered and refrigerated.

 d Ground foods are more likely to carry harmful bacteria because:

- a. they are usually frozen and must be thawed.
- b. grinding equipment is a source of harmful bacteria.
- c. it is more difficult to prepare ground foods in a clean manner.
- d. there is more surface for bacteria and the food is handled more.

 d If you should find some dirty equipment in the drawer or on the equipment rack, the best thing to do is:

- a. wipe off the dirt with your apron or a counter cloth.
- b. brush the dirt off with your hand or blow it away.
- c. return the equipment to storage and let someone else worry about it.
- d. take equipment to pot and pan area; clean the drawer.

d A fry cook knows he can sell 150 hamburgers over the lunch hour. Select the best way for him to plan this food preparation.

- a. Thaw hamburger patties the night before in refrigerator; fry all hamburgers before serving time; hold at 145°F.
- b. Thaw meat night before in refrigerator; bring meat to room temperature; fry hamburgers to order.
- c. Thaw patties at room temperature; fry all hamburgers at once; hold at 145°F.
- d. Thaw patties in refrigerator; fry hamburgers to order; if necessary hold cooked meat at 145°F.

c Catfish is on the dinner menu. 30 pounds of fish were defrosted but only 20 pounds of fish were cooked and served. What should be done with the remaining 10 pounds of fish?

- a. Wrap the fish carefully and refreeze.
- b. Plan to use the fish the next night.
- c. Cook the fish, cool, wrap, freeze.
- d. Throw the fish away because it might spoil.

b Which statement is most correct?

- a. A deep pan is used to refrigerate foods because it is most convenient.
- b. A deep pan may be used to cook foods but not to refrigerate foods.
- c. Use a deep pan for all food preparation and storage.
- d. A deep pan allows foods to cool quickly if the food is stirred.

b Before preparing a dinner item, a food service worker washed the work surface with a cloth he had thrown over his shoulder.

- a. The surface is now clean and ready for food preparation.
- b. The worker should use a clean cloth to wash the surface.
- c. It is not necessary to wash a surface before preparing foods.
- d. Always clean work surface, after preparation, with a clean cloth.

d Remember temperatures when preparing foods because:

- a. temperatures are a part of cooking directions and you will have a failure if you don't follow directions.
- b. cold temperatures are most important and kill bacteria. If foods are cold they are safe.
- c. room temperatures are out of the danger zone and foods are safest at room temperatures.
- d. temperatures are important to growth of bacteria. Don't give bacteria the right temperatures for growth.

c You found a cutting board that is cracked. The best thing to do is:

- a. throw the board away because it is dangerous.
- b. use the board only when absolutely necessary.
- c. tell the supervisor and do not use the board.
- d. scrub the board and be careful when you use it.

a If hot foods are held for several hours before serving:

- a. stir the foods to distribute the heat.
- b. the food will take on bad taste and odor.
- c. there is no chance the food may spoil.
- d. the best holding temperature is over 170°F.

c All work surfaces, including cutting boards, should be:

- a. cleaned at least once each day.
- b. rinsed and wiped when needed.
- c. washed thoroughly before and after each use.
- d. wiped with a dry cloth before and after use.

b "Try to avoid 'handling' foods". Select the best explanation for this statement.

- a. Always use a utensil when preparing foods.
- b. Your hands may carry dangerous bacteria to foods.
- c. Hands should not be used for any food preparation.
- d. Dangerous bacteria can not be carried to foods by your hands.

c A good rule to remember when preparing food ----

- a. Prepare large amounts of food all at once.
- b. Always prepare enough food so that some will be unserved.
- c. As much as possible, prepare foods to order.
- d. Have all dinner foods ready for service at least 2 hours before serving time.

c Pots and pans:

- a. are not a source of dangerous bacteria.
- b. do not have to be clean because heat will kill dangerous bacteria.
- c. are not to be used unless completely cleaned.
- d. are not important in the preparation and service of clean food.

c If meat is browned and hot on the outside:

- a. it is certain to be cooked in the center.
- b. the inside may be cooked but pink in color.
- c. center temperature should be checked with a thermometer.
- d. the meat will burn if it is cooked longer.

c Bacteria especially like foods held at:

- a. high, moist temperatures.
- b. cold temperatures.
- c. room temperatures.
- d. temperatures between 32-40°F.

d If a food is to be cooked:

- a. all dangerous bacteria will be destroyed.
- b. there is no chance the food may cause illness.
- c. it makes no difference how the food is handled.
- d. take care to avoid spreading bacteria to the food.

c To cool foods quickly, the cook should:

- a. blow on the food and stir.
- b. place food in a shallow pan and set near the window.
- c. transfer food to a shallow pan and stir.
- d. pour food back and forth from one pan to another.

b Remember to work clean and neat:

- a. when preparing hot foods like meat items.
- b. during any food preparation.
- c. does not apply to preparation of cold foods.
- d. means a cook should change her uniform daily.

SANITATION QUIZ

Unit 6. Safe Service of Foods

Directions. Read each question. Choose the statement that best answers the question and place the letter of your choice in the blank at the left.

- c You are working on a food line and are in charge of serving breads. What should you use to serve the breads?
- a. Hands.
 - b. Flat server.
 - c. Tongs.
 - d. Slotted spoon.
- c When you handle glassware by the base, which of the following is not true?
- a. Eating surfaces will remain clean.
 - b. You and the customer are protected.
 - c. Glass rims will pick up bacteria.
 - d. There is less chance to spread bacteria.
- d You are serving food and some food is spilled on your hand. Select the best answer.
- a. Lick your hand quickly, when no one is looking.
 - b. Wipe your hand on your apron.
 - c. Leave your job and wash your hands.
 - d. Carefully wipe your hand with a clean hand towel.
- c An employee may pick up bacteria from a customer through:
- a. bottoms of plates and dishes.
 - b. unused tableware.
 - c. rims of glasses and cups.
 - d. sealed food packets such as sugar.
- d If a customer does not use all his tableware, the unused items should be:
- a. returned to the clean dish area.
 - b. placed back on the table.
 - c. wiped with a service towel.
 - d. returned to the soiled dish area.

b When serving butter chips or pats, serve:

- a. only the exact amount needed.
- b. with tongs or a pick.
- c. using just the fingertips.
- d. from the hand, one piece at a time.

d You are a waitress. You dropped a pan of tableware on the floor. What next?

- a. Pick up tableware by the handles and neatly place it back in the pan.
- b. Sort through tableware to see if any of it looks dirty.
- c. Carefully wipe tableware on your apron before putting it back in the pan.
- d. Return spilled tableware to the soiled dish room.

c Why is safe service of foods a key to food sanitation? Safe service of foods:

- a. makes the food look and taste good.
- b. helps the customer feel at home and happy.
- c. prevents the spread and growth of bacteria.
- d. leads to a good image of the food service.

a A waiter is placing coffee cups on dining tables. He should:

- a. touch only the handles of the cups.
- b. blow in a cup to remove a spot of dirt.
- c. wipe the inside of each cup with serving towel.
- d. handle cups by the rims.

b Plates of food are stacked on top of each other. What problem could occur?

- a. The food will not look good and the customers will not eat it.
- b. The bottom of one plate may carry bacteria to another plate.
- c. No problem will occur unless the waitress is careless and spills food.
- d. The biggest problem is how to unload the plates at the table.

c When removing glasses and dishes from the table:

- a. there is no need to be careful because the customers are gone.
- b. handle dishes and glasses so they will not break.
- c. keep fingers away from eating surfaces to protect yourself.
- d. save any food that might be used again.

a Which statement is not true?

- a. A food service employee should never touch food with his hands.
- b. If a piece of equipment can be used to serve foods, use equipment.
- c. Many foods can be served with equipment. Use equipment when possible.
- d. When necessary, the employee may serve food with his hands.

c Select the statement that is most important for safe service of foods.

- a. The right equipment to serve all foods.
- b. Plenty of time so the employee is not rushed.
- c. Clean, neat, conscientious employees.
- d. A handy cloth or towel to wipe up spilled foods.

b Harmful bacteria are a cause of foodborne illness. These bacteria:

- a. are everywhere and cannot be destroyed.
- b. may be spread to the customer by the employee.
- c. are not important when food is being served.
- d. cannot be spread if foods are carefully prepared.

d Safe service of food applies to:

- a. only the kitchen employees.
- b. people working on a cafeteria line.
- c. only waiters and waitresses.
- d. each food service employee.

c When placing tableware on the table:

- a. grasp knives and forks by the handles, spoons by the bowl.
- b. rub any spots off the tableware with your apron.
- c. handle all the tableware by the handles.
- d. polish tines of all forks.

c Which statement best describes the way to serve ice?

- a. Since ice is cold, it does not need to be handled carefully.
- b. Serve ice cubes or crushed ice with the hands.
- c. Use a scoop or tongs to fill glassware with ice.
- d. Fill glassware with ice by dipping the glass into the ice.

a Your appearance may affect safe service of foods.
Which statement is correct?

- a. Each person working in a food service should cover his hair.
- b. Only waiters and waitresses need to have their hair covered.
- c. The person filling plates may need to have his hair covered.
- d. People who directly touch foods must have their hair covered.

c All employees should understand safe service of food because:

- a. this takes place mainly in the dining room.
- b. cooks may have to help waiters.
- c. foods are served in the kitchen and dining area.
- d. your boss thinks it is important for everybody.

a Which of the following may spread bacteria from the employee, to foods, to customers?

- a. Hands and face.
- b. Clean uniform and apron.
- c. Disposable hand towel.
- d. Clean, covered hair.

d Hands of the food service employee:

- a. are not a carrier of harmful bacteria.
- b. are of little importance in food service.
- c. seldom come in contact with bacteria.
- d. need special attention and care.

b If you use your hands to serve foods:

- a. wipe them on your apron.
- b. first wash and dry them at the hand sink.
- c. clean them with a counter cloth.
- d. lick fingers carefully then dry on your apron.

c Fingernails of the food service employee:

- a. are of no importance on the job.
- b. are not noticed by anyone but yourself.
- c. require special trimming and scrubbing.
- d. will not be seen when foods are served.

b A serving towel or side towel should be used to:

- a. wipe up spills on the floor.
- b. clean up food spots and changed often.
- c. wipe up a spill then thrown away.
- d. wipe hands when necessary.

c It is your responsibility to serve foods so they will be safe and clean. When serving foods, remember:

- a. if you are chewing gum, chew quietly.
- b. scratch your head only when necessary.
- c. avoid touching your face and hair.
- d. wipe hands on apron before touching food.

d A soiled serving towel:

- a. makes no impression on customers.
- b. cannot be avoided.
- c. should be kept out of sight.
- d. may spread bacteria to customers.

b After clearing dirty dishes you should:

- a. wash hands if it is convenient.
- b. always wash hands; use disposable towel.
- c. not bother to wash hands; it wastes time.
- d. use serving towel to clean hands.

b Foods, left on plates, returned to the kitchen should be:

- a. stored immediately and correctly.
- b. disposed of in the correct manner.
- c. saved if they look good.
- d. added to other unserved food.

c Prepared foods, like cold meats and salads, out for display should be:

- a. placed in a covered display case.
- b. easy for customers to reach.
- c. kept in a refrigerated display case.
- d. kept tightly covered.

a Covering foods on display will:

- a. protect them from coughs and sneezes of customers.
- b. maintain quality and flavor of foods.
- c. keep off odors away from foods.
- d. preserve the appearance and taste of the food.

c You are serving chilled salads on a cafeteria line.
You should:

- a. place salads on the line as needed.
- b. display all salads for best customer selection.
- c. store salads in the refrigerator until needed.
- d. allow the customers to sample the salads.

Directions. Read each statement. If the statement is true, place a (+) in the blank at the left; if the statement is false, place a (0) in the blank.

0 The customer cannot be a source of harmful bacteria.

0 It is not necessary to cover displayed foods.

0 The food service employee should never serve foods with his hands.

0 A cloth used to wipe table tops may be used as a hand towel.

0 People working in the dining room are the only ones that serve food.

0 Cooks do not need to know about safe service of foods.

+ When placing knives on the table, grasp by the handles.

0 It is more important to be careful when setting a table than when clearing it.

0 Cold foods cannot be a source of harmful bacteria.

0 Carry glasses by the rims to save many steps.

APPENDIX B

SANITATION OUTLINE

Unit 1. Why Food Sanitation

Unit Objective. To understand the importance of food sanitation. (The purpose of this unit is to help the food service employee understand foodborne illness; its cause, effect, and prevention.)

- I. Sequence of foodborne illness.
 - A. Many people eat out.
 - B. Foods cause foodborne illness.
 - C. Foodborne illness may be prevented through food sanitation.
 - D. Each employee has a part in food sanitation.
- II. Meaning of terms.
 - A. Food sanitation means preparation and service of safe, clean foods.
 - B. Foodborne illness occurs when foods carry harmful substances that cause illness.
 - 1. Foods cause illness because they contain chemical or natural poisons.
 - 2. Many dangerous bacteria in foods are a major cause of foodborne illness.
- III. Characteristics of bacteria.
 - A. Bacteria have complex names.
 - B. Not all bacteria are dangerous.
 - 1. Bacteria are used to manufacture foods.
 - 2. Other bacteria are used to manufacture drugs.
 - C. Detection of bacteria is difficult.
 - D. Bacteria can be found everywhere.

1. There are many bacteria in dirty places.
 2. Bacteria are moved from place to place.
- E. Moisture, temperature, and food are necessary for bacterial growth.
1. Temperatures affect the growth of bacteria.
 - a. Hot temperatures kill most harmful bacteria.
 - b. Growth of bacteria is retarded by cold temperatures.
 - c. Most bacteria grow best at room temperatures.
 2. Foods high in protein support bacterial growth.
 3. Under certain circumstances, bacteria grow rapidly.
- F. Many bacteria in foods cause foodborne illness.

IV. Control of foodborne illness.

- A. The employee is responsible for preparing and serving safe, clean foods.
1. Stop the spread and growth of bacteria.
 2. Help prevent foodborne illness.
- B. Keys to food sanitation are guides to follow.
1. Practice personal hygiene and grooming.
 2. Be aware of good housekeeping and clean-up procedures.
 3. Store all foods correctly.
 4. Apply sanitary food preparation techniques.
 5. Serve foods in a safe, clean manner.

SANITATION OUTLINE

Unit 2. Personal Hygiene and Grooming

Unit Objective. To develop good habits of personal hygiene and grooming. (The purpose of this unit is to help the food service employee use personal hygiene and good grooming as a key to food sanitation.)

- I. Role of the food service employee in food sanitation.
 - A. Personal hygiene and grooming influence attitudes.
 - 1. The well-groomed employee looks and feels good.
 - 2. Friends and co-workers appreciate good personal habits.
 - 3. If the employee is clean and neat, he will be able to prepare and serve safe, clean food.
 - 4. Customers judge a food service by the personnel.
 - B. Each employee is responsible for food sanitation.
 - C. Personal hygiene can prevent the spread and growth of bacteria.
- II. Standards of personal hygiene.
 - A. Keep hair clean and neat.
 - B. Take a daily bath.
 - C. Wear clean, neat clothing.
 - D. Brush teeth regularly.
 - E. Scrub hands and fingernails.
 - F. Repair and polish shoes.
 - G. Use first aid for cuts and sores.
- III. Appropriate hygiene and grooming for food service employees.
 - A. Food service employees wear uniforms and aprons.

- B. Each employee must cover his hair.
- C. Hands of the employee can be a source of harmful bacteria.
 - 1. Wash hands correctly.
 - 2. Keep fingernails clean and well-trimmed.
- D. An apron is used only to protect clothing.
- E. The mouth is a source of harmful bacteria.
 - 1. Do not chew gum while preparing food.
 - 2. Cover coughs and sneezes.
 - 3. Do not smoke in food preparation areas.
- F. Some personal habits are not appropriate when preparing foods.
 - 1. Avoid excessive make-up and jewelry.
 - 2. Do not wear beards.
- G. Physical health of the employee is important in food sanitation.
 - 1. Stay home when sick.
 - 2. Have a regular check-up.

SANITATION OUTLINE

Unit 3. Housekeeping and Clean-Up

Unit Objective. To appreciate the responsibilities for and the value of regular clean-up procedures. (Housekeeping and clean-up are a key to food sanitation. The purpose of this unit is to help the food service employee understand his part in keeping the food service safe and clean.)

- I. Results of a clean food service.
 - A. Soil and dirt are not seen or felt.
 - B. Harmful bacteria are killed or removed.
 - C. Safe, clean food can be served.
- II. Responsibilities of the employee in a clean food service.
 - A. Check cleaning schedule for duties.
 - B. Clean area and equipment as work is completed.
 - C. Use correct equipment and supplies for cleaning jobs.
- III. Cleaning supplies used in a food service.
 - A. Use detergents to wash and clean.
 - B. Use sanitizers to kill or inactivate bacteria.
 - 1. 170°F. water will sanitize.
 - 2. Hot air or steam will sanitize.
 - 3. A chemical, added to water, will sanitize.
 - C. For best results, use cleaning supplies correctly.
 - 1. Read instructions and follow directions.
 - 2. Measure supply for correct amount.
 - 3. Sanitize any surface that may touch food and can be washed with water.

IV. Maintenance of cleaning tools.

- A. Each employee should contribute to keeping cleaning tools in good repair.
- B. Cleaning rags should be changed often.
- C. Rags, sponges, brushes, and mops should be washed, rinsed, and sanitized.

V. Factors to consider in major clean-up areas.

- A. Non-moveable equipment requires special maintenance.
 - 1. Clean equipment after each use.
 - 2. Take equipment apart to clean all surfaces.
 - 3. Wash, rinse, and sanitize stationary equipment.
- B. Floors in a food service require constant care.
 - 1. Wipe up spills immediately.
 - 2. Mop floors as needed.
 - 3. Clean under and behind equipment.
- C. The dish room serves all employees.
 - 1. Maintain the dish room.
 - a. Keep equipment in good repair.
 - b. Clean the area and equipment daily.
 - 2. Use the dish room correctly.
 - a. Separate soiled dishes from clean ones.
 - b. Wash hands before touching clean dishes.
 - c. Drain dry all dishes and equipment.
 - d. Store dishes correctly.
 - 3. Use appropriate methods when washing dishes.
 - a. Manual dish washing must be safe.
 - b. Machine dish washing involves certain

procedures.

- c. Pot and pan washing is important.

SANITATION OUTLINE

Unit 4. Food Storage

Unit Objective. To understand and use appropriate storage of all foods. (Food storage is a key to food sanitation because, if foods are to be kept safe and clean, it is necessary to store them correctly. The purpose of this unit is to help the food service employee understand the kinds of food storage and the importance, use, and care of each storage area.)

- I. Reasons for food storage.
 - A. Storage controls the spread and growth of bacteria.
 - B. Correct storage helps maintain quality of food.
 - C. Storage procedures can prevent foodborne illness.
- II. Characteristics of dry storage.
 - A. Dry storage is used to protect foods from excessive heat, cold, and moisture.
 - B. Dry storage is appropriate for non-perishable foods.
 - C. Dry storage is maintained by controlling certain factors.
 1. Temperature control is essential.
 2. The storage area must be neat and clean.
 - a. Stack like items together.
 - b. Rotate stock.
 3. Air must circulate around foods.
 - a. Pack foods loosely.
 - b. Do not set foods directly on the floor.
 4. Storage should keep flies and rodents out.
 - D. Special storage is needed for certain items.

III. Characteristics of refrigerated storage.

- A. Foods are protected by refrigerated storage.
 - 1. Cold temperatures help prevent bacterial growth.
 - 2. Cold temperatures control food spoilage.
 - 3. Cold temperatures maintain quality of food.
- B. Perishable food items are stored in refrigerated storage.
- C. Refrigerated storage is maintained by controlling certain factors.
 - 1. Set temperatures between 35-40°F.
 - 2. Allow air to circulate around foods.
 - 3. Keep neat and clean.
 - a. Store unserved, cooked foods correctly.
 - b. Use leftover and oldest foods first.
 - c. Clean regularly.
- D. Many foods are placed in frozen storage.
 - 1. Maintain temperature at or below 0°F.
 - 2. Thaw frozen foods in the refrigerator.
 - 3. Use thawed foods as quickly as possible.

IV. Thermometer checks in food storage areas.

- A. Store frozen foods at or below 0°F.
- B. Store perishable foods between 35-40°F.
- C. Store non-perishable foods between 40-70°F.
- D. Hold food, on the steam table, above 140°F.

SANITATION OUTLINE

Unit 5. Clean Food Preparation

Unit Objective. To know and apply sanitary food preparation techniques. (Clean food preparation is an essential key to food sanitation. The purpose of this unit is to help the food service employee learn and be able to use procedures that will result in clean food preparation.)

- I. Value of clean food preparation.
 - A. Preparation techniques prevent the spread and growth of bacteria.
 - B. Preparation techniques are a step to quality food.
- II. Use of a recipe.
 - A. The recipe lists kinds and amounts of ingredients.
 - B. The recipe shows steps in preparation.
 - C. The recipe gives cooking directions.
- III. Equipment in food preparation.
 - A. When possible, use equipment to prepare food.
 - B. Wash and store large equipment correctly.
 - C. Keep small equipment clean.
 - D. Avoid using defective equipment.
 - E. Clean work surfaces before and after preparation.
- IV. Temperature and timing during food preparation.
 - A. Allow the shortest time possible between preparation and service of foods.
 - 1. Most bacteria grow best at room temperature.
 - 2. High temperatures destroy most harmful bacteria.
 - B. Cook foods to correct internal temperatures.

- C. Give extra care to ground and chopped foods.
 - 1. Keep food chopping equipment clean.
 - 2. Chill chopped ingredients before using.
 - 3. If possible, cook chopped meats immediately.
- D. Hold unserved, cooked foods at the right temperature.
- E. Stir foods often if they are held for periods of time.
- F. Unserved, cooked foods may develop bacterial growth.
 - 1. Place in a shallow pan.
 - 2. Cool quickly.
 - 3. Refrigerate immediately.
- V. Procedures when preparing foods.
 - A. Prepare food in small batches.
 - B. Keep work area clear and clean.
 - C. Cover foods to keep bacteria out.
 - D. Wash fresh foods before use.
 - E. Keep tasting procedures clean.

SANITATION OUTLINE

Unit 6. Safe Service of Foods

Unit Objective. To become aware of the need for and to practice proper serving techniques. (Safe service of foods is a key to food sanitation and will protect both the customer and the employee. The purpose of this unit is to show how foods may be served to prevent the spread of harmful bacteria.)

- I. Importance of serving food correctly.
 - A. Spread and growth of bacteria can be prevented if food is served correctly.
 - B. Courtesy is important in service of food.
 - C. Transfer of bacteria takes place constantly.
 1. The employee can spread bacteria.
 2. A customer can spread bacteria.
 3. Safe serving techniques protect the customer and employee.
- II. Techniques of serving safe, clean foods.
 - A. Any time and any way a food is offered, there is service of foods.
 1. Some foods are served in the kitchen.
 2. Foods are served in dining areas.
 - B. When possible, use equipment to serve foods.
 - C. Serve foods and dishes correctly.
 1. Keep fingers out of dished foods.
 2. Keep hands and fingers away from eating surfaces.
 - a. Use handles of tableware.
 - b. Move cups by the handles.

c. Carry glasses by the base.

D. Use a serving towel to wipe up food spots.

E. Apply rules of service to clearing.

III. Protection of foods on display.

A. Customers and employees may contaminate displayed foods.

B. Dirt and dust may contaminate displayed foods.

C. Food covers protect foods from contamination.

APPENDIX C

VISUAL TRAINING PROGRAM

Why Food Sanitation

Slide 1.



Slide 2.



Slide 3.



Slide 4.



Slide 5.



Slide 6.



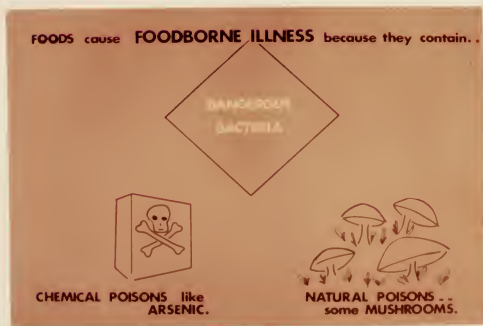
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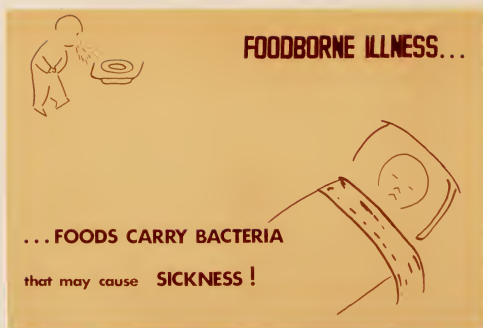
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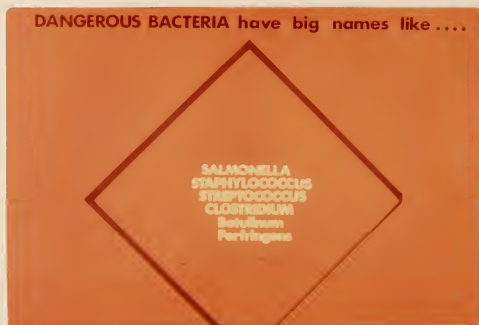
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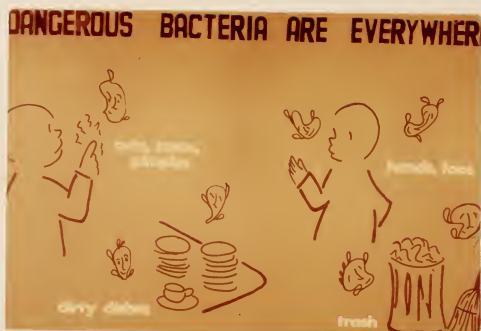
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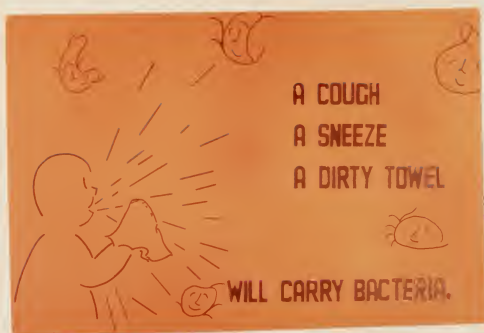
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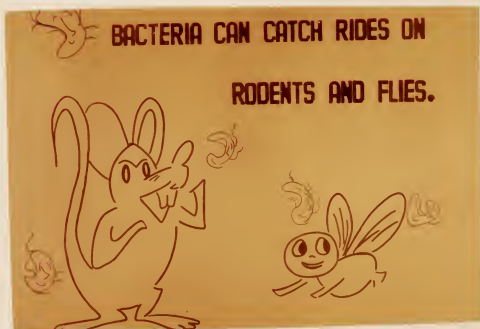
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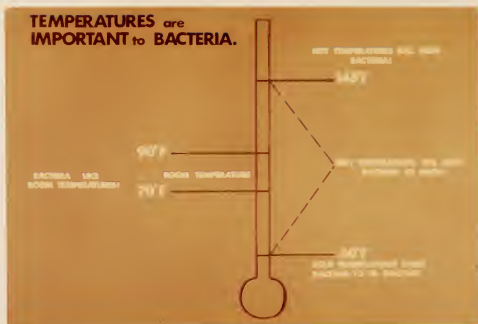
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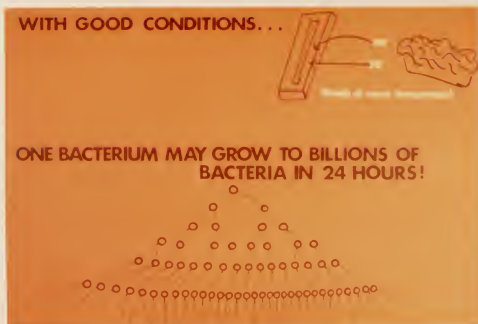
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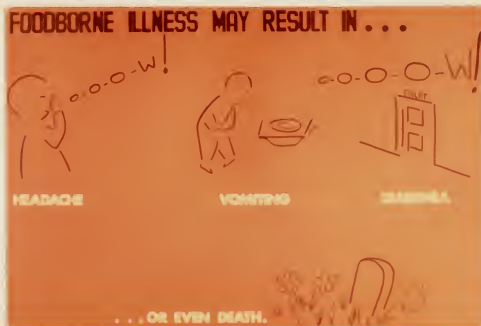
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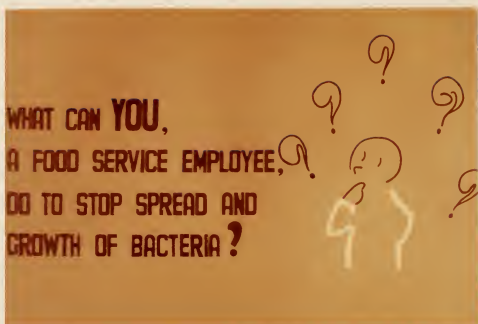
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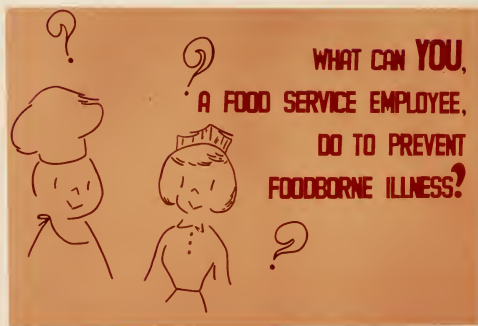
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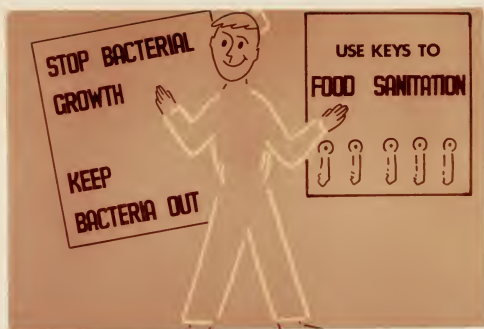
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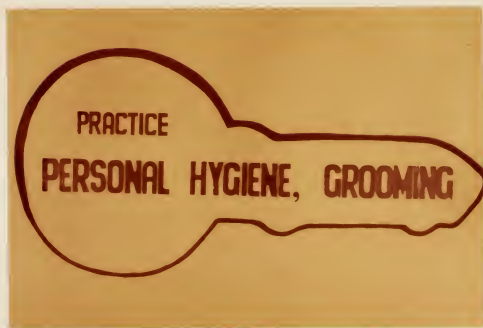
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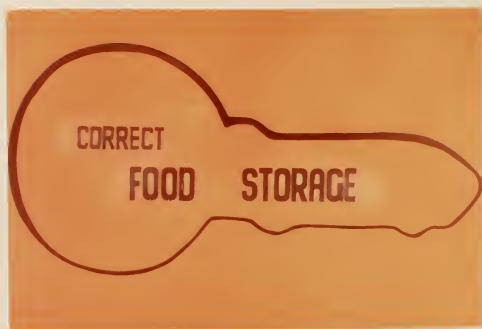
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Slide 32.



Slide 33.



Slide 34.



Slide 35.



APPENDIX D

BACKGROUND QUESTIONNAIRE

Please complete all information.

1. Name _____
 Last Name First Name

2. Age _____ Grade _____ Sex: _____ F _____ M

3. Have you ever worked in a food service?

_____ Yes _____ No

If you have worked in a food service, how long did you
have the job?

(Please state number of months or years) _____

4. Have you had any training in food service work?

_____ Yes _____ No

If you have had training in food service work, please
describe the kind of training you received.

DEVELOPMENT OF A TRAINING PROGRAM IN SANITATION
FOR FOOD SERVICE PERSONNEL

by

JUDITH ANN HOLLE

B.S., Kansas State University, 1963

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

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Manhattan, Kansas

1969

Size and extent of the food service industry coupled with changes in food processing, distribution, and preparation have led to an increased awareness of the need for constant and thorough food sanitation procedures. Essential training in sanitation may not be conducted because of lack of time, training materials, and qualified instructors. Sanitation is the responsibility of each food service operation and a part of every food service job, therefore appropriate sanitation training of food service personnel cannot be overlooked.

The purpose of this study was to develop a basic sanitation training program for non-professional food service personnel and to evaluate the effectiveness of the program using two methods of instruction. A six unit training program was developed. Subject matter in each unit was illustrated with cartoon drawings and presented by 35 mm color slides. A limited investigation was conducted to determine the effectiveness of Unit 1. The program was presented by individual slide study, Method I, and group lecture, Method II.

Thirty-four students, enrolled in Homemaking II classes at Clay Center Community High School, were test subjects. Subjects were equally divided into two groups, depending on the hour enrolled in Homemaking. All instruction and testing were conducted during the regular Homemaking class period. Subjects in both groups completed a written examination at three intervals; two weeks prior to instruction, immediately following instruction, and three weeks after instruction.

Criteria for determining effectiveness were group differences for immediate gain, retention, and over-all improvement.

Method II was better for immediate gain and somewhat better for retention and over-all improvement. Instruction time for Method II was 35 minutes compared to an average of 11 minutes for Method I. Method I was self-paced and self-instructional although an instructor was required to give introductory remarks and an explanation of equipment.

The training program was effective when presented by either method of instruction. Although Method II was better in some ways, Method I offered the advantage of being self-instructional. A well-structured training program may be used for training food service personnel when presented through individual slide study or group lecture.

